

C L A I M S

- 5 1. Method for providing a coating on the surfaces of a product with an open cell structure throughout its structure, **characterised in that** said coating is provided by means of a plasma polymerisation process.
- 10 2. Method according to claim 1, **characterised in that** said product with an open cell structure is degassed before performing the plasma polymerisation process.
3. Method according to claim 2, **characterised in that** the degassing is exerted by means of drying the open cell polymer in a drying kiln.
- 15 4. Method according to claim 2, **characterised in that** the degassing is exerted within the plasma polymerisation device.
5. Method according to claims 3 or 4, **characterised in that** said degassing is exerted by a temperature between 20 °C and 200 °C.
- 20 6. Method according to any one of claims 1 to 5, **characterised in that** the plasma polymer process is performed in a vacuum.
7. Method according to any one of claims, **characterised in that** in the plasma polymer process a monomer vapour is used.
- 25 8. Method according to claim 7, **characterised in that** said monomer vapour consists of a monomer or a mixture of monomers containing halogen and/or phosphor and/or nitrogen and/or silicon.
- 30 9. Method according to claim 8, **characterised in that** the monomer(s) result from precursor gas(es) or liquid(s) selected from fluor containing compounds

and/or phosphor containing compounds and/or silicon containing compounds and/or nitrogen containing compounds.

- 5 10. Method according to claim 9, **characterised in that** the monomer(s) result from precursor(s) selected from CF_4 , C_2F_6 , C_3F_6 , C_3F_8 , C_4F_8 , C_5F_{12} and/or C_6F_{14} or other saturated or unsaturated fluorocarbons (C_xF_y) or hydrofluorocarbons.
- 10 11. Method according to claim 9, **characterised in that** the monomer(s) result from precursor(s) selected from trimethylphosphate, triethylphosphate, tripropylphosphate or other derivatives of phosphoric acid.
- 15 12. Method according to claim 9, **characterised in that** the monomer(s) result from precursor(s) selected from ethylamine, triethylamine, allylamine or acrylonitrile.
13. Method according to any one of the preceding claims, **characterised in that** said product with an open cell structure is an open cell polymer.
- 20 14. Method according to claim 13, **characterised in that** said open cell polymer is a polyurethane, a polyethylene, a melamine or a polystyrene foam.
- 25 15. Method according to any one of the claims 1 to 12, **characterised in that** said product with an open cell structure is a sintered open-cell reticulated/foam-like structure.
16. Method according to claim 15, **characterised in that** said sintered open-cell reticulated/foam-like structures are made out of pure metals, alloys or ceramics.
- 30 17. Method according to any one of the claims 1 to 12, **characterised in that** open cell structure is a semi-open celled foam.

18. Method according to claim 17, characterised in that said semi-open celled foam is an urethane, a polyethylene or a polystyrene semi-open celled foam.
- 5 19. Use of a method according to any one of the preceding claims with the goal to obtain a hydrophobe, oleophobe, flame retardant and/or barrier coating on the surfaces of an open cell polymer throughout its polymer structure.